Architecture and the Problems of Users' Cognition, Behavior and Stimulus

Dr. Wagih Fawzi Youssef

Abstract

The effects of scientific discovery have led many to fear the influence of scientists. This fear is no more apparent than in the realm of architecture. Many of the weakness in present day design can be traced to inhibitions which derive from erroneous assumptions about human behavior. More scientific understanding of man should help free architecture from these inhibitions. This paper highlights some variables and determinants of behavior as well as perceptual, psychological and cognitive factors that underlie the design of architectural elements and architectural spaces within different environments. The final section of the paper turns to a symptom of the weakness of architectural design in addressing the problem of overcrowding especially in terms of health mitigation.

Keywords: *social class, human performance, pollution, privacy, city image*

INTRODUCTION

Design developments may actually be aggravating social stress. Many of the decisions made in relation to buildings are based upon assumptions about people and their interactions with buildings. In designing buildings most architects are constantly involved in what the buildings look like. They are trying to create a physical form which will be perceived in a particular set of ways. Thus any designer of a building should not expect that the users of his design will deal with it, but will respond to it on the basis of the learned patterns he had acquired through contact over the years with similar designs. This does not mean that architects should only produce buildings similar to those which already exist. What it does mean is that no matter how new the particular form is produced the chances are that people will have learned responses that will enable them to deal with the building.

Past experience gives rise to a reduction in the range of likely reactions to future ones. Thus if a particular stimulus commonly occurs in relation to a given response then we expect the response to follow the stimulus. Such expectations may well be the basis of formal developments within architecture and provide the groundwork for many styles ancient and modern.

It is possible that quite different designs would be produced by people taking different sides of the controversy. The other possibility is that a set of buildings experienced can

give rise to a particular mode of learning and might explain why people brought up in cities with gridiron plans get so easily lost in European cities and in Cairo, for instance.

VARIABLES AND DETERMINANTS OF BEHAVIOR

The main determinants of behavior have relevance in architecture in relation to responses to specific environment stimuli. If, for instance there were innate tendencies to move towards the brighter part of any space then the architect must discover the secret of these cases to produce the type of responses. Piaget shows that there are basic mechanisms that evolve and develop through the interaction of the organism with its environment. Architects cannot assume that people will enter their buildings with certain inherent propensities to react in certain ways. Rather, the architect must realize the buildings will to some degree determine the way people will interact with those buildings. But whether the architect wishes it or not will always be an interaction never simply a reaction.

Sex Differences

The architect should take into consideration the differences of behavior regarding sex differences. Men perform differently from women, for the male is physically stronger but less resilient. He is more independent, he has greater spatial, numerical and mathematical ability, and he is more likely to construe the world in terms of objective ideas and theories. While the female at the outset possesses those sensory capabilities which facilitate inter-personal communion; physically and psychologically she matures more rapidly, her verbal skills are precautious and fluent, she is more nutrient, affiliated, more consistent, and is likely to construe the world in personal, moral and aesthetic terms. There is a great overlap between the sexes so that there is reasonable probability of finding males with the female characteristics and vice versa. However such profound differences run through a large number and wide range of human behaviors does imply that in any situation in which we are interested in individual variation, it will be then necessary to take sex differences into consideration. This applies both at the practical level in which we may be considering in the design of buildings for different types of personnel at the theoretical level.

Age Differences

Age differences are as broad in their influence as those of sex. Social class is a central variable in sociology. These differences have psychological as well as sociological implications, because the experience and attitudes of people in different classes is demonstrably different and because the variability of age and sex do also inter-relate with social class. This variability and interaction cannot be dismissed when considering people's reactions to buildings because it is almost certain that in the great majority of

cases these variables will reveal significant differences in reactions. In addition, instead of dealing with perceptual phenomena, another way in which people differ consistently, relates to the structural aspects of their cognition.

Perceptual, Psychological and Cognitive Factors

The architect may think of buildings in terms of the proportions of their facades whilst another may think of them in terms only of their cost per meter square. They would be different from others who thought about buildings from many different viewpoints. These differences relate to their cognition and its underlying patterns of structure. This distinction owes much to communication and information theory as it draws an analogy between different types of communication channels. The idea behind this can be appreciated by considering any expert consultant. What distinguishes the consultant from the non-expert with regard to the judgments he makes in his area of expertise is that he is aware of a far greater number of possible relations between things. He is prepared to differentiate more precisely between degrees of these differences than the non-expert. The more complex person is more likely to be consistent in the view he holds and is more able to deal with conflicting information.

People are more complex in their perceptions about other people than they even are about buildings. This suggests that the effects of buildings upon the perception of others might have a much greater impact then upon the direct perception of buildings themselves.

There is a relationship between the level of emotional arousal and the efficiency and the effectiveness of psychological performance. When people are over-excited people do not perform very well. There seems to be some sort of optimum level of psychological arousal at which they perform best. Each individual has his own built-in level of arousal. Thus those high in extraversion require more stimulation to reach their optimum, whereas those high in introversion require less stimulation to reach the same optimum level. Those high in extraversion are more likely to learn a task which produces an increase in stimulation. Also there is a relationship between the amount of privacy and types of stimulations which have quite different effects.

The relevance for architects of dividing up people according to intellectual ability is at two levels. At the level of users of buildings it would seem that people with different intellectual abilities would be able to cope or would be likely to deal with the building in different ways and as a consequence, it would be necessary to take these different patterns of behavior into account.

At a more fundamental level, it should be realized that public buildings may well be used by people drawn from the lowest as well as the highest range of intellectual level. On the other hand, from the point of view of understanding the design process, we must take the intellectual capabilities of different designers into account and understand the ways in which these different abilities give rise to different types of buildings. The architect can then consider a broad range of potential users and behaviors in his building.

The Effect of Windows

Most buildings have windows, their size and shape influence the appearance of the façade of a building, and because the qualities of the internal environment usually derive from them, they influence both the shape of buildings and the way in which those buildings are arranged in relation to one another. Thus an understanding of the psychological implication of windows could have a marked impact upon many aspects of the design of buildings. We must clarify whether we are dealing with aspects of human performance, whether we are dealing with perceptual judgments or whether it is really the meaning associated with windows and the relationship which that meaning has to various aspects of satisfaction, which is our concern.

From the viewpoint of human performance it would seem that windows provide the opportunity of light of certain types at certain angles and with a certain degree of variability and also often the opportunity of a reasonable control over ventilation. Investigations showed that people could perform remarkably well under low light levels. Unless we are dealing with very specific task, then variations in light level have little direct effect. Even if they did, artificial lighting systems are built to provide reasonable levels quite effectively. Performance does relate to small variations in temperature, and in this respect it would seem that the degree of control afforded by the possibility of opening windows is worth bearing in mind.

Windows also satisfy the need to keep contact with the outside. What can contact with the outside offer is that it can provide us with information about changes in the diurnal and seasonal patterns and information about weather. Large windows overlooking country scenes had a direct association with a certain quality of life. By providing carried and large-scale internal views is possibly one reason why there seems to be such antagonism towards windowless environments.

Multi-story dwellings as they exist today limit the range of interactions that are possible. Buildings with long internal corridors without windows are often found to be very disorienting for new-comers. A rich variety of stimuli which vary with the time of day and year has been provided by means of windows.

Privacy Issues

In multiple family dwellings there is the sharing of walls, ceilings, and floors and as the number of common partitions increases, privacy decreases. The common walls between units resulted in constant annoyance of each family by the other. Noise from their living rooms was heard by the other family and vice versa. This infringement of privacy also existed at a more personal level, because the units shared bedroom walls as well. Since the residents are aware of the problem, they attempt to keep noise at a minimum. However, doing so often means curtailing the normal play of children, keeping radios, televisions, and musical instruments very low. There may be long term effects of such enforced behavior on the development of healthy intra-family relations.

Invasion of privacy is not restricted to auditory dimension. The arrangement of doors for dwelling units within a building provokes considerable annoyance in a number of residents although the arrangement of side doors or face-to-face doors encourage social relations between residents of the units.

Public Housing Space

Another factor that may have an undesirable effect on behavior is that in the case of public housing. Public housing is generally constructed with one objective: providing low cost accommodations for the maximum number of families. Consequently, to the builder, space is usually at a premium, both within the buildings and around them. This strictly budgeted, high density housing environment combines with the characteristics of the project's residents to produce a setting up and paralleled for adverse reactions.

The reasons cited for dissatisfaction in a public housing complex were the inability to survey children's activities, mistrust of others in the building and fear of being assaulted or robbed outside the apartment. The physical design of public housing is a major contributor to resident dissatisfaction.

Hospital Environments

Structures such as offices and hospitals contain more persons interacting to accomplish a general objective, whether for the management of business affairs or the provision of healthcare to a large number of patients. In a hospital, however, color is likely to be considered aesthetically for its contributions to a pleasant atmosphere and the alleviation of unnecessary patient discomfort and dissatisfaction. In penal institutions color may be used to provide inmates with a source of environmental variety.

Many of the activities in a hospital are highly specialized, requiring great amount of skill and planning. Reliability and efficiency are of prime importance in the design of hospital

environments. For example two categories of patients and staff can be divided depending on patient age, type of illness or injury, specialties of the physicians, roles of the nurses, similarly each category of patient or staff may have environmental needs in the stages of diagnosis, treatment and convalescence different from those of the other subcategories.

In ward design travel is assumed to be an important factor because a substantial amount of nurse's time is taken up by travel an excessive travel has been cited a source of dissatisfaction by ward nurses. Lippert suggests that the most efficient ward design is one that allows for the most patient visited per tour, with the fewest utility stops.

Office Environments

Typically, behavior in offices is geared towards one purpose, maximum output within reasonable cost limitations. The designer of an office building must provide for optimal communication between departments, workflow within and between various groups, supervisor-subordinate relationships, and allocation of jobs between men and machines. An integral part of this consideration is the continuous provision for individual work efficiency whether he is a clerk or an executive.

Another factor that can affect behavior in offices is ambient environmental conditions. Temperature, humidity, illumination and noise can produce comfort or annoyance, thus affecting performance. Noise affects not only the worker's emotional state but also his efficiency. Other complaints were directed at the great difference between indoor and outdoor temperature in summer, and the necessity of keeping windows closed during the warmer months as the result of using air-conditioning. Workers prefer to work under natural illumination than in that lit artificially, because light obtained from windows is considered an important office feature by employees. It appears to be a function of a psychological desire for windows. Also students do not like the windowless room.

The open plan office is claimed to have social and psychological advantages. Also the landscape office design is said to provide greater opportunity for an aesthetically pleasing environment because the designer can use planters as dividers and has greater latitude in color schemes. Thus besides being economical, the large open plan office implies behavioral advantages in both job-related activities and feelings of well-being and aesthetic satisfaction on the part of employees.

City Image

The inhabitants of a city acquire a cognitive map of the city and this map results from both the personal characteristics of an individual and the physical characteristics of the city. One of the factors important in forming an image of a city has been referred to as

urban atmosphere. Psychologists have found it hard to define just what an urban atmosphere is and to isolate its components.

There are many visual components of a city that are of interest to those concerned with urban atmosphere. It is a complex interaction of the inhabitants' characteristics and city's characteristics that forms the urban atmosphere, but the urban atmosphere is difficult to quantify as the perception of a city is affected by the status of the perceiver. Kevin Lynch points out that there are other influences on the development of an image of a city, such as its social meaning, its history, its function, and even its name. He decomposed the city image into five physical elements: paths, edges, districts, nodes, and landmarks. Urbanites do not care that they lack spontaneity and have withdrawn behind critical façades that exist in a perennial state of distrust and reserve.

Residential Overcrowding and Health

There is a relationship between certain characteristics of the urban environment and mental illness, heart disease, and hypertension. One characteristic thought to be associated with these types of pathology is high population density, which leads to the experience of overcrowding.

Types of undesirable effects attributed to overcrowding are:

1- Physical effects: starvation, pollution, slums, disease, physical malfunctions.
2- Social effects: poor education, poor physical and mental health facilities, crime, riots and war.
3- Interpersonal and psychological effects: drug addiction, alcoholism, family disorganization, withdrawal, aggression, and decreased quality of life.

However many slum residents are satisfied with their neighborhood because of the extensive social relationships they have formed there. Forcibly moving persons from areas to which they have become deeply attached often causes what has been called a grief syndrome, which can result in crying spells and psychosomatic illnesses, such as intestinal disorders, vomiting and nausea. Many residents of slum areas have a strong sense of belonging. The physical area surrounding their homes is viewed as an integral part of the home and serves as a framework for a vast set of social ties. Residential satisfaction in suburban areas is determined by good physical facilities, good schools, and relative safety from crime, access to stores, jobs, good environmental quality and little congestion.

When population density increases and people feel overcrowded, they perceive the situation as involving some degree of threat and, consequently, will experience stress. People control interactions with others in a variety of ways, ranging from locking themselves in a room to avoid interacting with others as completely as possible to subtle non-verbal behavior, such as turning away or assuming some type of bodily posture that may discourage interactions with others.

Our society is based on an increasingly complex technology which tends to pollute the environment. Pollution, air, noise, water and other types is seen as a threat to both their physical and their psychological health. Air pollution degrades the quality of life, disrupts activities.

Noise Pollution

Noise pollution is becoming more of a problem in that demographic changes are causing more of the population to be exposed to noise sources. As more and more people move into urban regions, increases in pollution density significantly increase the number of people exposed to noise pollution. High noise levels increase the likelihood of diseases associated with tension such as duodenal ulcers.

Long exposure to high intensity noise does result in hearing loss. There have been reports that long exposure to noise may result in mental health problems for some persons. A European study reports correlation between cardiovascular irregularities and intense occupational noise exposure. Other studies found that adults living near airports had a higher morbidity rate than did persons living some distance away.